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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/887,827

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Joseph A. Abys

Abys 52-14-6-6

7859

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11/16/2006

HITT GAINES, PC
LUCENT TECHNOLOGIES INC.
PO BOX 832570
RICHARDSON, TX 75083

EXAMINER

LEWIS, MONICA

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 11/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/887,827

Applicant(s)

ABYS ET AL.

Examiner

Monica Lewis

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 7-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the response filed September 15, 2006.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4-6, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Soeda et al. (Japanese Patent No. 1-259195).

In regards to claim 1, Soeda et al. ("Soeda") discloses the following:

a) a metal substrate (For Example: See Page 4 under Operations of the Invention);
and

b) overlying the substrate a surface finish comprising a layer of tin or tin alloy in an internal tensile stress state (For Example: See Page 5).

In regards to claim 4, Soeda discloses the following:

a) an underlayer of nickel, nickel alloy, cobalt, cobalt alloy, iron or iron alloy chosen to generate or maintain tensile stress in the layer of tin or tin alloy above the underlayer (For Example: See Page 4 under Operations of the Invention).

In regards to claim 5, Soeda discloses the following:

a) the tin or tin alloy has a thickness in the range .5 to 10 micrometers (For Example: See Page 5).

Additionally, the applicant has not established the critical nature of the tin or tin alloy has a thickness in the range .5 to 10 micrometers. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical,

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generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

In regards to claim 6, Soeda discloses the following:

a) the underlayer has a thickness in the range of 0-20 micrometers (For Example: See Page 4).

Finally, the applicant has not established the critical nature of the dimension of underlayer which has a thickness in the range of 0-20 micrometers. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

In regards to claim 11, Soeda discloses the following:

a) the tensile stress inhibits whisker growth (For Example: See Page 5).

In regards to claim 12, Soeda discloses the following:

a) the internal stress is attributable to the layer being deposited under tensile stress (For Example: See Page 5).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claim 2 is rejected under 35 U.S.C. 103(a) as obvious over Soeda et al (Japanese Patent No. 1-259195) in view of Tsujita et al. (Japanese Patent No. 51-143533).

In regards to claim 2, Soeda fails to disclose the following:

a) a layer of tin or tin alloy has an average grain size in excess of about 1 micrometer.

However, Tsujita et al. ("Tsujita") discloses a semiconductor device that has a layer of tin or tin alloy has an average grain size in excess of about 1 micrometer (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Soeda to include a grain size in excess of about 1 micrometer as disclosed in Tsujita because it aids in reducing the formation of whiskers (For Example: See Abstract).

Additionally, since Soeda and Tsujita are both from the same field of endeavor, the purpose disclosed by Tsujita would have been recognized in the pertinent art of Soeda.

Finally, the applicant has not established the critical nature of the dimension of grain size in excess of about 1 micrometer. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as obvious over Soeda et al (Japanese Patent No. 1-259195).

In regards to claim 3, Soeda fails to disclose the following:

a) the average tensile stress is in excess of about 2 Mpa.

However, the applicant has not established the critical nature of the dimension of stress which is in excess of about 2 MPa. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

Response to Arguments

7. Applicant's arguments filed 9/15/06 have been fully considered but they are not persuasive. First, Applicant argues that "Soeda fails to clearly disclose whether its tin alloy is in either a compressive or a tensile state...it indicates that its sample was placed indoors, and that whiskers formed in the portion...on the compressive stress side." Applicant provided a document titled *Suppression of Tin Whisker Growth through Optimized Tin Plating Chemistry Formulation Technistan*, the document states that "compressive stress is the driving force for tin whisker growth and that a tin deposit which does not exhibit compressive stress will never form compressive stress...tensile stress counter-acts the compressive stress effects mentioned previously and produces a whisker-resistant tin coating." Soeda discloses that "the increase in internal stress of the tin coating layer is small...it is inferred that the formation of whiskers is inhibited" (For Example: See Page 5). Therefore, tensile stress is present in Soeda because whiskers are inhibited.

Second, Applicant argues that Soeda fails to disclose that "the internal stress is attributable to the layer being deposited under tensile stress...Soeda makes clear that its internal stress is attributable to the oxidation of the tin with the elapse of time." However, Soeda does

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not disclose that the internal stress is attributable to oxidation. Soeda discloses that "a coating layer containing zinc at less than 10%, the amount of diffusion of zinc is small...the increase in the internal stress of the tin coating is small...it is inferred that the formation of whiskers is inhibited by this synergistic effect."

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization

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where this application or proceeding is assigned is 571-273-8300 for regular and after final communications.

ML

October 30, 2006



M. Wilczewski
Primary Examiner
TC 2800